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BUCHANAN, INGERSOLL & ROONEY PC
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| EXAMINER | |
|---|---|
| RAJAN, KAI | |
| **ART UNIT** | **PAPER NUMBER** |
| 3736 | |
| **NOTIFICATION DATE** | **DELIVERY MODE** |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com
debra.hawkins@bipc.com

#H

| Office Action Summary | Application No.<br>10/681,137 | Applicant(s)<br>KONG ET AL. | |
|---|---|---|---|
| | Examiner<br>Kai Rajan | Art Unit<br>3736 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1 - 44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *See Continuation Sheet*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :5/07/2004, 11/12/2004, 4/09/2004,9/21/2005,3/14/2006,6/06/2007.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 6, 8, 16, 17, 18, 21, 22, 26, 29, 31, 33, 37, 39, recite the limitations "PPG, EDA, SKT, and SVM." There is insufficient antecedent basis for this limitation in the claim. These abbreviations have not been defined further in the claims or specification, beyond the basic definition given that "PPG, EDA, and SKT signals" are heart rate, skin resistance, and skin temperature signals, respectively. It is unclear whether Applicant is merely claiming "heart rate, skin resistance, and skin temperature," or if specific types of the aforementioned parameters are being claimed.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant discloses:

"a subtracter unit for obtaining differences between the analysis results from the feature analysis unit and feature values on which the user's emotional state is determined based; and

an SVM unit for analyzing the differences of the feature values obtained by the subtracter unit, classifying the user's emotional state, and calculating and outputting an index and level for a specific emotion among the classified emotions."

Examiner cannot discern the specific functions of the "SVM unit" or "subtracter unit" from the claim language or specification. Examiner invites Applicant to further explain the functions of the "SVM unit" and the "subtracter unit."

Examiner has used his best judgment and applied prior art in a manner sufficient to reject the claim.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1 – 8, 10, 11, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Ark et al. U.S. Patent No. 6,190,314.**

1. A mobile device with an input unit, a display unit, a memory unit and a central control unit, the mobile device comprising:

a biomedical signal measurement module for detecting biomedical signals from a user's body, classifying the detected biomedical signals by respective signals and outputting the classified signals (Column 2 lines 12 – 50); and a health care module for analyzing a user's emotional state and physical condition based on the classified signals input from the biomedical signal measurement module and user's physical information (Column 2 lines 12 – 50).

2. The mobile device as claimed in claim 1, wherein the biomedical signal measurement module comprises:

a sensor unit for detecting one or more biomedical signals from the user's body (Column 2 lines 12 – 50, figure 1 item 12); and

a sensor control unit for controlling the sensor unit, classifying the biomedical signals input from the sensor unit by the respective biomedical signals and outputting the classified biomedical signals (Column 4 line 66 – column 5 line 1, column 5 lines 31 – 32).

3. The mobile device as claimed in claim 2, wherein the sensor unit comprises a heart rate sensor for detecting heartbeat-related biomedical signals (Column 2 lines 12 – 50).

4. The mobile device as claimed in claim 3, wherein the biomedical signals of heartbeat are PPG signals (Column 2 lines 12 – 50).

5. The mobile device as claimed in claim 2, wherein the sensor unit comprises a skin temperature sensor for detecting skin temperature-related biomedical signals (Column 2 lines 12 – 50).

6. The mobile device as claimed in claim 2, wherein the biomedical signals of skin temperature are SKT signals (Column 2 lines 12 – 50).

7. The mobile device as claimed in claim 2, wherein the sensor unit comprises a skin resistance sensor for detecting skin resistance-related biomedical signals (Column 2 lines 12 – 50).

8. The mobile device as claimed in claim 7, wherein the biomedical signals of skin resistance are EDA signals (Column 2 lines 12 – 50).

10. The mobile device as claimed in claim 2, wherein the sensor unit comprises at least one of a heart rate sensor, skin temperature sensor, skin resistance sensor and body fat sensor, and the sensor unit further comprises a filter for filtering the detected biomedical signals and an amplifier for amplifying the filtered biomedical signals (Column 2 lines 12 – 50, figure 2 items 28, 34, 36, 44, 46, 48, 50).

11. The mobile device as claimed in any claim 2, wherein the sensor unit comprises at least one of heart rate sensor, skin temperature sensor, skin resistance sensor and body fat sensor and wherein the sensor unit is installed at a position on the mobile device with which user's hand comes into contact when the user holds the mobile device (Column 2 lines 12 – 50).

15. The mobile device as claimed in claim 1, wherein the health care module comprises:

an emotional state analysis unit for analyzing the biomedical signals input from the biomedical signal measurement module and determining the user's emotional state (Column 2 lines 12 – 50); and

a physical condition analysis unit for analyzing the user's physical condition based on the biomedical signals input from the biomedical signal measurement module and the user's physical information (Column 2 lines 12 – 50).

**Claims 1, 2, 9, and 12 – 44 are rejected under 35 U.S.C. 102(e) as being anticipated by Teller et al. U.S. Patent No. 7,261,690.**

1. A mobile device with an input unit, a display unit, a memory unit and a central control unit, the mobile device comprising:

a biomedical signal measurement module for detecting biomedical signals from a user's body, classifying the detected biomedical signals by respective signals and outputting the classified signals (Column 9 line 52 – column 10 line 37); and

a health care module for analyzing a user's emotional state and physical condition based on the classified signals input from the biomedical signal measurement module and user's physical information (Figure 1 item 30, table 2).

2. The mobile device as claimed in claim 1, wherein the biomedical signal measurement module comprises:

a sensor unit for detecting one or more biomedical signals from the user's body (Figure 1 item 10); and

a sensor control unit for controlling the sensor unit, classifying the biomedical signals input from the sensor unit by the respective biomedical signals and outputting the classified biomedical signals (Column 9 lines 52 – 67).

9. The mobile device as claimed in claim 2, wherein the sensor unit comprises a body fat sensor for measuring body impedance required for calculation of a body fat percentage (Column 7 lines 35 – 56, table 1).

12. The mobile device as claimed in claim 2, wherein the sensor control unit corrects user-to-user variation of the biomedical signals which are output from the sensor unit (Column 9 lines 52 – 67).

13. The mobile device as claimed in claim 1, wherein the biomedical signal measurement module is constructed to be detachably coupled to the mobile device (Column 13 lines 1 – 15).

14. The mobile device as claimed in claim 13, wherein the biomedical signal measurement module is constructed in the form of a case capable of accommodating the mobile device therein (Column 13 lines 1 – 15).

15. The mobile device as claimed in claim 1, wherein the health care module comprises:

an emotional state analysis unit for analyzing the biomedical signals input from the biomedical signal measurement module and determining the user's emotional state (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2); and

a physical condition analysis unit for analyzing the user's physical condition based on the biomedical signals input from the biomedical signal measurement module and the user's physical information (Column 18 line 57 – column 19 line 30).

16. The mobile device as claimed in claim 15, wherein the emotional state analysis unit comprises:

a feature analysis unit for analyzing features of the biomedical signals detected from the user's body (Column 8 lines 53 – 67);

a subtracter unit for obtaining differences between the analysis results from the feature analysis unit and feature values on which the user's emotional state is determined based (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2); and

an SVM unit for analyzing the differences of the feature values obtained by the subtracter unit, classifying the user's emotional state, and calculating and outputting an index and level for a specific emotion among the classified emotions (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2).

17. The mobile device as claimed in claim 16, wherein the feature analysis unit comprises:

a heartbeat analysis unit for receiving PPG signals to detect heartbeat signals and extracting feature values related to the heartbeat signals (Column 7 lines 35 – 56, column 9 lines 52 – 67);

a skin conductive response analysis unit for receiving EDA signals and extracting feature values related to a skin conductive response (Column 7 lines 35 – 56, column 9 lines 52 – 67); and

a skin temperature analysis unit for receiving SKT signals and extracting feature values related to skin temperature (Column 7 lines 35 – 56, column 9 lines 52 – 67).

18. The mobile device as claimed in claim 17, wherein the heartbeat analysis unit comprises:

a heartbeat detection unit for receiving the PPG signals to detect the heartbeat signals and converting the detected heartbeat signals into time series signals of heart rate variability (Column 7 lines 35 – 56);

a spectrum analysis unit for analyzing a spectrum of the heartbeat signals in response to the time series signals of the heart rate variability (Column 8 lines 53 – 67); and

a mean/standard deviation calculation unit for calculating a mean value and standard deviation value of the heartbeat signals in response to the time series signals of the heart rate variability (Column 8 lines 53 – 67).

19. The mobile device as claimed in claim 18, wherein the heartbeat detection unit comprises:

a band pass filter for extracting signals falling within a specific band of the PPG signals (Column 9 lines 52 – 67, column 26 lines 29 – 66);

a median filter for removing noise existing in the filtering results of the band pass filter (Column 9 lines 52 – 67, column 26 lines 29 – 66);

an adder for calculating a difference between the filtering results of both the band pass filter and the median filter by adding a reciprocal number of the filtering result of the median filter to the filtering result of the band pass filter (Column 9 lines 52 – 67, column 26 lines 29 – 66);

a matched filter for extracting the heartbeat signals from output signals of the adder (Column 9 lines 52 – 67, column 26 lines 29 – 66); and

a zero clipper for performing zero clipping for the heartbeat signals (Column 9 lines 52 – 67, column 26 lines 29 – 66).

20. The mobile device as claimed in claim 16, wherein the subtracter unit uses feature values of a user's normal emotion as the feature values on which the user's emotional state is determined based (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2).

21. The mobile device as claimed in claim 16, wherein the SVM unit comprises:

an SVM classifier for classifying the user's emotional state into a plurality of categories by analyzing the differences of the features values obtained from the subtracter unit (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2); and

an emotional state determination unit for selecting values related to the specific emotion among values of the plurality of emotions classified by the SVM classifier and calculating and outputting the index and level for the specific emotion (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2).

22. The mobile device as claimed in claim 21, wherein the SVM unit further comprises:

a database for storing a plurality of pieces of emotion data for training the SVM classifier, and trained results of the SVM classifier based on the emotion data (Column 15 lines 6 – 20, column 19 lines 45 – 55).

23. The mobile device as claimed in claim 15, wherein the physical condition analysis unit comprises:

a body fat percentage calculation unit for calculating body fat percentage based on a body impedance value detected by the biomedical signal measurement module and user's height, weight, age and sex (Column 7 lines 35 – 56, table 1); and

a calorie consumption calculation unit for calculating calorie consumption due to exercise based on average heart rates and body fat percentages before/after exercise detected by the biomedical signal measurement module (Figure 6, table 2).

24. A health care method using a mobile device, comprising the steps of:

detecting biomedical signals from a user's body (Column 9 line 52 – column 10 line 37);

classifying the detected biomedical signals by respective signals (Column 9 line 52 – column 10 line 37); and

analyzing the user's emotional state and physical condition based on the classified signals and user's physical information (Column 9 line 52 – column 10 line 37, table 2).

25. The method as claimed in claim 24, wherein further comprising the steps of:

selecting, by a user, a health care menu on a mobile device with a biomedical signal measurement module (Column 16 line 48 – column 17 line 17); and

if the user selects emotional state measurement, activating the biomedical signal measurement module to detect the biomedical signal in the mobile device (Column 16 line 48 – column 17 line 17).

26. The method as claimed in claim 25, wherein the step of analyzing the user's emotional state and physical condition comprises the steps of:

analyzing the detected biomedical signals and extracting a plurality of feature values to be used for determining user's emotional state (Column 8 lines 53 – 67);

calculating differences between the plurality of extracted feature values and feature values on which the user's emotional state is determined based (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2); and classifying the user's emotional state by respective emotions based on SVM classification according to the calculated differences of the feature values (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2).

27. The method as claimed in claim 26, wherein further comprising the step of:

selecting values related to an emotion selected among the classified emotions, calculating an emotional state index and level for the selected emotion, and displaying the calculated emotional state index and level on a display unit of the mobile device (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2).

28. The method as claimed in claim 24, wherein the biomedical signals detected from the user's body include biomedical signals of heartbeat (Column 7 lines 35 – 56).

29. The method as claimed in claim 28, wherein the biomedical signals of heartbeat are PPG signals (Column 7 lines 35 – 56).

30. The method as claimed in claim 24, wherein the biomedical signals detected from the user's body include skin temperature-related biomedical signals (Column 7 lines 35 – 56).

31. The method as claimed in claim 30, wherein the biomedical signals of skin temperature are SKT signals (Column 7 lines 35 – 56).

32. The method as claimed in claim 24, wherein the biomedical signals detected from the user's body include skin resistance-related biomedical signals (Column 7 lines 35 – 56).

33. The method as claimed in claim 32, wherein the biomedical signals of skin resistance are EDA signals (Column 7 lines 35 – 56).

34. The method as claimed in claim 24, wherein the biomedical signals detected from the user's body are filtered by a filter and then amplified by an amplifier (Column 9 lines 52 – 67).

35. The method as claimed in claim 24, further comprising the step of correcting user-to-user variation of the biomedical signals detected from the user's body (Column 9 lines 52 – 67).

36. The method as claimed in claim 35, wherein the step of correcting the user-to-user variation of the biomedical signals comprises the steps of:

determining whether the user's body is in contact with the biomedical signal measurement module (Column 25 lines 30 – 43);

if it is determined that the user's body is in contact with the biomedical signal measurement module, determining whether the correction of the user-to-user variances of the detected biomedical signals is required (Column 26 lines 29 – 67);

if it is determined that the correction of the user-to-user variances of the detected biomedical signals is required, checking whether values of the detected biomedical signals are above a maximum limit level and decreasing a gain of an amplifier if the values of the detected biomedical signals are above the maximum limit level (Column 26 lines 29 – 67); and

if the values of the detected biomedical signals are equal to or less than the maximum limit level, checking whether the values of the detected biomedical signals are equal to or less than a minimum limit level and increasing the gain of the amplifier if the values of the detected biomedical signals are equal to or less than the minimum limit level (Column 26 lines 29 – 67).

37. The method as claimed in claim 26, wherein the step of analyzing the biomedical signals and extracting the plurality of feature values to be used for determining the user's emotional state comprises the steps of:

receiving PPG signals to detect heartbeat signals and extracting feature values related to the heartbeat signals (Column 7 lines 35 – 56, column 9 lines 52 – 67);

receiving EDA signals and extracting feature values related to a skin conductive response (Column 7 lines 35 – 56, column 9 lines 52 – 67); and

receiving SKT signals and extracting feature values related to skin temperature (Column 7 lines 35 – 56, column 9 lines 52 – 67).

38. The method as claimed in claim 26, wherein the feature values on which the user's emotional state is determined based are feature values of user's normal emotion (Column 7 lines 35 – 56, column 9 lines 52 – 67, column 19 lines 45 – 55).

39. The method as claimed in claim 26, wherein the step of classifying the user's emotional state by the respective emotions uses an SVM classifier that classifies the user's emotional state into a plurality of categories based on a statistical learning theory (Column 19 lines 45 – 55, figure 8 various levels of stress and relaxation, table 2).

40. The method as claimed in claim 25, wherein the biomedical signal measurement module is configured to be detachably coupled to the mobile device (Column 13 lines 1 – 15).

41. The method as claimed in claim 40, wherein the biomedical signal measurement module is constructed in the form of a case capable of accommodating the mobile device therein (Column 13 lines 1 – 15).

42. The method as claimed in claim 25, further comprising the steps of, if the user selects body fat measurement,

activating a body fat sensor in the biomedical signal measurement module mounted to the mobile device (Column 7 lines 35 – 56);

measuring body impedance from the user's body by the body fat sensor (Column 7 lines 35 – 56); and calculating a body fat percentage of the user's body based on the measured impedance and user's physical information and displaying the calculated the body fat percentage on the display unit (Column 7 lines 35 – 56, column 12 lines 31 – 44).

43. The method as claimed in claim 25, further comprising the steps of, if the user selects calorie consumption measurement,

activating a heart rate sensor and a body fat sensor in the biomedical signal measurement module (Column 7 lines 35 – 56);

measuring heartbeat signals and body impedance before/after exercise from the user's body by the heart rate sensor and the body fat sensor (Column 7 lines 35 – 56); and

analyzing the heartbeat signals and the body impedance before/after exercise to calculate average heart rates and body fat percentages before/after exercise, calculating calorie consumption due to exercise based on the calculated average heart rates and body fat percentages before/after exercise, exercise time, and user's physical information, and displaying the calculated calorie consumption on the display unit (Column 7 lines 35 – 56, column 12 lines 31 – 44, column 18 line 57 – column 19 line 30, table 2).

44. The method as claimed in claim 25, further comprising the step of, if the user selects history management, displaying measurement results according to respective desired terms on the display unit (Figure 11).

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kai Rajan whose telephone number is 571-272-3077. The examiner can normally be reached on Monday-Friday 9:00AM to 4:00PM.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael Astorino

KR
August 29, 2007